Forty Streets in One

Wherever MAZDA lamps are used—whatever their application—it is the Engineering Department's responsibility to know that they are serving their purpose well. The Nela School of Lighting and the publications of the Engineering Department are educational activities which assist in the discharge of this responsibility.

The Nela School of Lighting at Nela Park, Cleveland, extends you a cordial welcome. It is a School whose entrance qualification is your interest, and whose tuition is your time—a few minutes or a few hours. Here the magic of light is portrayed by unique exhibits and striking demonstrations. Engineer, executive, and casual visitor alike are shown how best to adapt light to their daily needs; clearly and convincingly they see for themselves the benefits to be derived from proper illumination.

Through its publications the Engineering Department endeavors to make widely available the facts on MAZDA lamps and their correct applications in the various fields of illumination.

FORTY STREETS IN ONE

Is your city planning street lighting extensions or revisions? The full-scale demonstrations at Nela Park enable you to study the latest street lighting developments and see for yourself the system which best meets your city's needs.

Public officials, central stations, civic organizations, and all others who are interested in street lighting are cordially invited to make use of the services described in this booklet.

NATIONAL LAMP WORKS
OF GENERAL ELECTRIC CO.
NELA PARK, CLEVELAND

Nela Booklet S-1

April 15, 1925

East 152nd Street, Cleveland — "Forty Streets in One."

Forty Streets in One

Adequate street lighting is a municipal necessity. Its benefits are directly allied with the aims of all who are encouraging civic advancement; its services are rich contributions to the safety, comfort, and convenience of the citizens.

Yet street lighting has not kept pace with the increasingly rigid requirements imposed by the rapid growth of cities and by the addition of hundreds of thousands of motor cars each year on the already congested streets. However, where a city now has an unsatisfactory lighting system, the reason is not, in most cases, because of the city's failure to appreciate the value of adequate street lighting. Usually it has been due to the lack of a comprehensive plan of development, and to the difficulty of obtaining first-hand experience on the correct solutions of the various problems involved.

A Comprehensive Plan

Rome was not built in a day—neither is a modern system of city street lighting. And as is true for any large project, the first essential in the development of a good street lighting system is a thoroughly comprehensive plan. Briefly, this plan should consist of a careful zoning of all the streets in the city into various classifications based on their lighting requirements, and the adoption of a standardized lighting system for each classification. The table on Page 4 shows the principal factors which should be covered in

Street Lighting Practice

Population of City	Classification of Street	Lumens per Post	Mounting Height, Feet	Lamp Spacing, Feet	Lumens per Foot of Street Minimum	Lumens per Foot of Street Desirable	Arrangement of Lamps on Street
100,000 or Larger	Principal Business	15000–50000	18–25	100–150	400	400–1000	Opposite
	Secondary Business	10000–25000	15–18	80–125	200	200–500	Opposite
	Principal Thoroughfares	10000–15000	15–20	100–150	70	70–200	Opp. or Stag.
	Boulevards and Parks	4000–10000	15–20	100–150	30	30–100	Opp. or One Side (O. S.)
	Secondary Thoroughfares, Wholesale and Mfg. Dis.	4000–10000	15–20	100–150	30	30–70	Staggered
	Residential	2500–4000	13–20	125–200	15	15–30	Staggered
	Alleys in Business Section	2500–4000	16–20	125–200	15	15–30	One Side
	Outlying Streets and Alleys	1000–2500	16–20	200–300	3	3–8	One Side
30,000 to 100,000	Principal Business	10000–30000	15–20	80–125	300	300–500	Opposite
	Secondary Business	10000–15000	15–18	80–125	200	200–300	Opposite
	Principal Thoroughfares	6000–15000	15–20	100–150	40	40–150	Staggered
	Boulevards and Parks	4000–10000	15–20	100–150	30	30–100	Opp. or O. S.
	Secondary Thoroughfares	4000–10000	15–20	100–150	30	30–70	Staggered
	Residential	2500–4000	13–20	125–200	15	15–30	Staggered
	Outlying Streets and Alleys	1000–2500	16–20	200–300	3	3–8	One Side
5,000 to 30,000	Business	6000–15000	14–18	80–125	120	120–300	Opposite
	Principal Thoroughfares	4000–10000	15–20	100–200	30	30–100	Staggered
	Secondary Thoroughfares	4000–6000	15–20	100–200	20	20–60	Staggered
	Residential	2500–4000	13–20	150–250	10	10–20	Stag. or O. S.
	Outlying Streets and Alleys	1000–2500	16–20	200–300	3	3–8	One Side
5,000 or Less	Business	4000–10000	13–16	80–110	80	80–200	Opposite
	Thoroughfares	2500–6000	15–20	100–200	20	20–60	Stag. or O. S.
	Residential	2500–4000	13–20	150–300	8	8–15	Stag. or O. S.
	Outlying Streets and Alleys	1000–2500	16–20	200–300	3	3–8	One Side
High-ways	Light Pavement	2500–4000	25–35	300–400	6	6–12	One Side
	Dark Pavement and Dirt Roads	2500–4000	25–35	200–300	8	8–20	One Side

these standard systems, and indicates values which represent good practice.

The adoption of a comprehensive plan does not mean that the entire city need be relighted at one time—although in some cases this is desirable—but it does insure that the extensions and revisions made over a period of years will form a part of a unified design. Otherwise a haphazard variety of conglomerate equipment inevitably results. Such a tangle is happily avoided by using for all classes of streets a "family" of lighting equipment, consisting of globes and posts of similar design but of different dimensions, and with different lamp sizes.

A Standardized System

The streets of a city can be grouped into the various classifications without much uncertainty, but standardizing on a proper lighting system for each classification is more difficult. This is due to the fact that it is almost impossible to *describe* illumination. Lighting effects must be *seen*—they must be *experienced*!

To obtain first-hand experience on which to base the standardization of lighting systems, city councils have found it desirable to visit some sister city in which a far-sighted development program is reasonably complete. However, not many cities are in a position to serve as models, and in order to cover the subject thoroughly, councils have had to visit several cities, requiring the expenditure of considerable time and money. Even where such a trip is made, much of the advantage of comparison

is lost because of the lapse of time and the different conditions under which the various systems are seen.

A much better method is now available for the study of street lighting effects. City councils are invited to come to Nela Park, where the whole story of street lighting is told in a nutshell.

Forty Streets in One

Through the cooperation of the City of Cleveland, the Cleveland Electric Illuminating Company, and the National Lamp Works, forty separate circuits, presenting forty different lighting systems, have been installed on a 2000-foot stretch of city street near Nela Park. In this outdoor laboratory, street lighting principles and effects are demonstrated thoroughly and clearly. The forty different systems include lamp sizes of 1000 lumens (100 candlepower) to 30,000 lumens (3000 candlepower), spacing distances of 75 feet to 900 feet, mounting heights of 11 feet to 26 feet, lighting units located from 2 feet back of the curb line to the center of the street, units with various types of light distribution, and systems in which the units are staggered, opposite, or all on one side of the street.

With this full-scale experimental station, the different lighting systems may be switched on at will, and the lighting effects studied in detail, compared directly, and that system found which best meets the requirements of the particular problem under consideration. The technical features of street lighting design thus cease to be complicated and uncertain—they become simple and definite.

Excellent "White Way" lighting in a city of 12,000 population.

MODERN STREET LIGHTING

The Show Window of the City

Attracts out-of-town buyers.
Shows progressiveness of administration.
Attracts industries.
Advances civic pride.
Stabilizes and increases real estate values.
Promotes other civic improvements.

A Guardian of Safety and Comfort

Lessens crime.
Facilitates traffic.
Assists fire and police departments.
Reduces traffic accidents.

The "Nela White Way"

After studying the technical features of street lighting, such as lamp size, mounting height, spacing, etc., the major consideration is the appearance of the lighting equipment. A direct comparison of the various types of equipments is as important in this study as it is in determining the correct technical features of the system. An opportunity for this comparison of appearance is afforded by the "Nela White Way," which is an exhibition of ornamental street lighting equipment comprising nineteen different types of standards and lighting units—representative equipments of the large fixture and post manufacturers.

From this exhibit, definite ideas can be obtained of the day and night appearance of the units. Each unit can be turned on and off individually, so that its appearance when lighted, as well as its particular characteristics of light diffusion and light distribution, may be observed without interference from adjacent units.

Equipments are now available which not only are efficient but also assist in the making of a "city beautiful." These modern units present a marked contrast to the inefficient multi-lamp clusters that were at one time widely used for White Way lighting, and to the unsightly wooden-pole, mast-arm, dangling-wire types which have been used extensively in the past for the lighting of thoroughfares and residence streets.

On the following pages are pictures and brief descriptions of the individual units of the "Nela White Way."

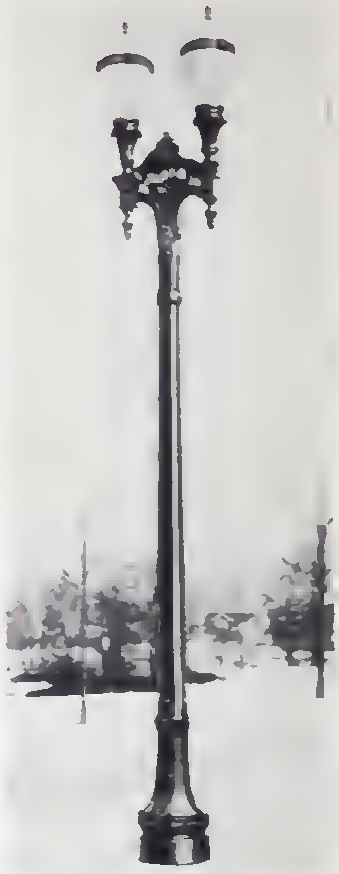
The "Nela White Way"

No. 1

Form 9 Novalux Unit with No. 126 alabaster rippled glass globe and canopy, made by the General Electric Co.—Union Metal Mfg. Co. pressed steel standard, Design No. 1161—25,000 lumen (2500 c. p.) MAZDA C lamp—Height to light sources 19 feet and 25 feet.

No. 2

Paragon Senior Top with opalescent rectilinear glass globe, canopy, and Edgewater "A" cast iron post with duplex extension, made by the George Cutler Works of the Westinghouse Electric & Mfg. Co.—15,000 lumen (1500 c.p.) MAZDA C lamp—Height to light source 20 feet.

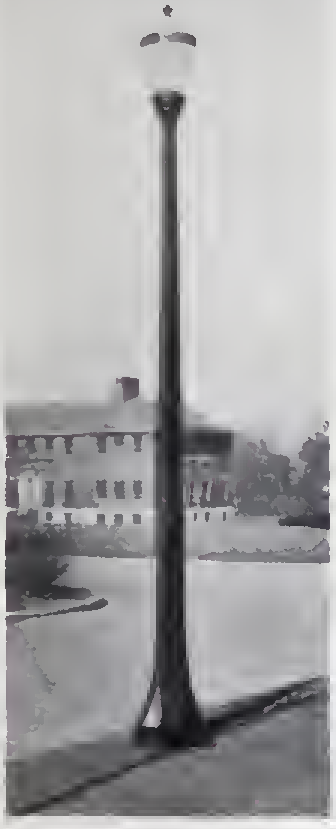


No. 3

Form 12 Novalux Unit with No. 124 alabaster rippled glass globe and canopy, made by the General Electric Co.—King Mfg. Co. cast iron standard French Design No. 64—15,000 lumen (1500 c. p.) MAZDA C lamp—Height to light source 20 feet.

No. 4

Form 9 Novalux Unit with No. 126 alabaster rippled glass globe and canopy, made by the General Electric Co.—Union Metal Mfg. Co. pressed steel standard, Design No. 2153—25,000 lumen (2500 c. p.) MAZDA C lamp—Height to light source 18 feet.



No. 5
Paragon Senior Top with opalescent rectilinear glass globe, canopy and cast iron post, Design Arcadian "A," made by the George Cutter Works of the Westinghouse Electric & Mfg. Co.—15,000 lumen (1500 c. p.) MAZDA C lamp—Height to light source 16 feet.

No. 6
Form 23 "B" Novalux Lantern Unit with Colonial alabaster glass panels and dome refractor, made by the General Electric Co.—Union Metal Mfg. Co. pressed steel standard, Design No. 842—15,000 lumen (1500 c. p.) MAZDA C lamp—Height to light source 15 feet.

No. 7
Form 16 Novalux Unit with light alabaster rippled glass globe, canopy and dome refractor, made by the General Electric Co.—King Mfg. Co. cast iron standard, Design No. 45—15,000 lumen (1500 c. p.) MAZDA C lamp—Height to light source 15 feet.

No. 8

Form 18 "B" Novalux Lantern Unit with clear stippled glass panels and dome refractor, made by the General Electric Co.—King Mfg. Co. cast iron standard French Design No. 62—15,000 lumen (1500 c. p.) MAZDA C lamp—Height to light source 15 feet.

No. 9

Form 16 Novalux Unit with No. 57 Genco glass globe and metal canopy, made by the General Electric Co.—Electric Railway Equipment Co. tubular steel standard, Design No. 10814A—15,000 lumen (1500 c. p.) MAZDA C lamp—Height to light source 13½ feet.

No. 10

Form 16 Novalux Unit with No. 118 alabaster rippled glass globe and canopy, made by the General Electric Co.—Electric Railway Equipment Co. combination railway and light standard, Design No. 10462—10,000 lumen (1000 c. p.) MAZDA C lamp—Height to light source 15 feet—Length of bracket arm 2 feet.

No. 11

Form 24 "B" Novalux Lantern Unit with Colonial alabaster glass panels and dome refractor, made by the General Electric Co.—Union Metal Mfg. Co. pressed steel standard with bracket, Design No. 1106—10,000 lumen (1000 c. p.) MAZDA C lamp—Height to light source 18 feet—Length of bracket arm 2½ feet.

No. 12

Form 6 Novalux Unit with No. 116 clear rippled glass globe and dome refractor, made by the General Electric Co.—Union Metal Mfg. Co. pressed steel standard, Design No. 895—10,000 lumen (1000 c. p.) MAZDA C lamp—Height to light source 18 feet—Length of bracket arm 2 feet.

No. 13

Form 25 "B" Novalux Basket Style Unit with light alabaster rippled glass globe and dome refractor, made by the General Electric Co.—Union Metal Mfg. Co. tubular steel standard, Design No. 1260—10,000 lumen (1000 c. p.) MAZDA C lamp—Height to light source 20 feet—Length of bracket arm 6 feet.

No. 14

Octagonal Reflecto-Lux Junior Lantern with stippled glass panels, parabolic reflectors and cast iron standard, Design Arcadian "C," made by the George Cutter Works of the Westinghouse Electric & Mfg. Co.—4000 lumen (400 c. p.) MAZDA C lamp—Height to light source 13 feet.

No. 15

Form 12 Novalux Unit with No. 123 light alabaster rippled glass globe, canopy and dome refractor, made by the General Electric Co.—Union Metal Mfg. Co. pressed steel standard, Design No. 1537—4000 lumen (400 c. p.) MAZDA C lamp—Height to light source 13½ feet.

No. 16

Bowlolite—Three-piece GlassRefractor Unit made by the Holophane Glass Co.—Metal fixture parts made by the Line Material Co.—Massey Concrete Products Corp. concrete post, Design No. 0-13—4000 lumen (400 c. p.) MAZDA C lamp—Height to light source 14 feet.

No. 17

Form 17 Novalux Harp Type Unit with No. 125 alabaster rippled glass globe, made by the General Electric Co.—King Mfg. Co. cast iron standard, Design No. 45—4000 lumen (400 c. p.) MAZDA C lamp—Height to light source 14½ feet.

No. 18

Milwaukee Harp One-piece Glass Refractor Unit, made by the Holophane Glass Co.—Metal fixture parts made by the Line Material Co.—Massey Concrete Products Corp. concrete post, Design No. 0-13—4000 lumen (400 c. p.) MAZDA C lamp—Height to light source 15 feet.

No. 19

Form 25" "A" Basket Type Novalux Unit with light alabaster rippled glass globe and dome refractor, made by the General Electric Co.—Union Metal Mfg. Co. tubular steel standard, Design No. 1360—4000 lumen (400 c. p.) MAZDA C lamp—Height to light source 16 feet—Length of bracket arm 4½ feet.

Street Lighting Room

The street lighting room in the Nela School of Lighting supplements the "Forty Streets in One" and the "Nela White Way." Here the city council or other civic organiza-

tion may discuss with Nela Engineers the various details of the contemplated lighting system, as the city council in the accompanying picture has done.

This conference room is fully equipped to facilitate such discussions. In addition to a complete library of street lighting literature, it contains exhibits of typical units and auxiliary apparatus of various types.

The services described in this booklet are available to the little village and the great city alike, in order that they may get the maximum value from their expenditures for street lighting.


NELA PARK
CLEVELAND
NATIONAL
MAZDA
LAMPS